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Notes on the Afrotropical hover fly genus *Meromacroides* Curran (Syrphidae, Eristalinae)

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Abstract

The African endemic hover fly *Meromacroides meromacriformis* (Bezzi, 1915) (Syrphidae, Eristalinae) was described more than a century ago and its monotypic status established in 1927, but subsequent collections and publications are rare. Only the male has been described and nothing is known about its biology. We re-describe the male, including geographic variation, describe the female for the first time and provide the first DNA barcodes for the species. Despite the large range and observed variations, there is insufficient evidence to describe additional taxa in the genus. Biological observations are presented, which may shed some insight into this rare and enigmatic hover fly, whose known distribution now spans the Afrotropical Region.

Keywords

Africa, Afrotropical Region, DNA barcoding, flower fly, taxonomy

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Introduction

The African endemic hover fly species *Meromacroides meromacriformis* (Bezzi, 1915) (subfamily Eristalinae) was described as *Eristalis meromacriformis* by Bezzi (1915), based on a single male from "South Africa", without a collecting date and was said to be in poor condition. The type specimen was from the Natural History Museum UK (NHMUK, formerly the British Museum of Natural History – BMNH) collection. The species is clearly distinct from any other Afrotropical eristaline on account of the apical brown spots on the wings, the dichoptic eyes in the male and the strongly enlarged metafemur. Later, Curran (1927) studied two males from Stanleyville [=Kisangani] in the Democratic Republic of the Congo (DRC) (collected on 8 and 10 April 1915) and two females from the same locality (one without collecting date, the other collected in March 1915) without giving a description of the female. Based on his observations, he placed the species in its own genus, *Meromacroides* Curran, 1927. The genus and species name were chosen because the species shows a close resemblance to species of the Nearctic and Neotropical genus *Meromacrus* Rondani, 1848 in the microtrichosity and colour pattern on the wings, in the dichoptic eyes of the male, in the swollen appearance of the metafemora and in the shape of the abdomen. However, in contrast to species of the genus *Meromacrus*, the eyes are pilose and the face has a well-developed tubercle. The phylogenetic affinities of the genus *Meromacroides* within the Afrotropical Region are not well known; however, on the basis of morphological characters, the genus appears to be closely related to *Senaspis* Macquart, 1850 (see Morales 2011) from which it differs in the dichoptic eyes in the male (holoptic in *Senaspis*), the pilose eyes (bare in *Senaspis*) and the more swollen metafemur (more slender in *Senaspis*). A key to the hover fly genera of the Afrotropical Region is imminent (Ssymank et al. in press), allowing differentiation of these genera.

The males studied by Curran (1927), differed only slightly from the description as given by Bezzi (1915) in having the wing veins bordered with diffuse yellowish-brown, the wings appearing more darkened than described and the tibiae being rather brownish apically (Curran 1927). De Meyer et al. (1995) reported on two specimens, one from Kenya and one from Uganda, in the collections of NHMUK and the National Museums of Kenya (NMK), respectively, although we could not trace the NMK specimen during visits in 2016 and 2019. We thus consider the specimen as lost (L. Njoroge, pers. comm.). Finally, Smith and Vockeroth (1980) list the species from South Africa and Uganda without providing details. As Smith and Vockeroth (1980) cite Curran (1927), but do not include the DRC in the known distribution, this reference to Uganda may be erroneous.

Information about the species is sparse: the description given by Bezzi (1915) is very brief, the notes by Curran (1927) even more so, the type is said to be in poor condition and pictures or illustrations are lacking (Whittington 2003), except for Ssymank et al. (in press) who illustrate the lateral view and wing of a female. In addition, the male, described by Bezzi (1915), differs slightly from the males studied by Curran (1927), suggesting some intraspecific morphological variation. Here, we re-describe the male of *M. meromacriformis* and describe the female for the first time, including geographic variation, provide high-resolution images of both sexes and of the male genitalia and provide the first DNA barcodes for the genus.

Materials and methods

Study material

Study material was obtained from the following institutions:

AMNH American Museum of Natural History, New York, USA;
IITA International Institute of Tropical Agriculture, Calavi, Benin;
KMMA Koninklijk Museum voor Midden-Afrika, Tervuren, Belgium;
NHMUK Natural History Museum UK, London, UK;
NMSA KwaZulu-Natal Museum, Pietermaritzburg, South Africa;
SAMC Iziko Museum, Cape Town, South Africa.

Morphology

Morphological terminology follows Cumming and Wood (2017), except that we use the suffixes pro-, meso- and meta- to refer to the first, second and third pair of legs or leg parts, respectively. Morphological observations were made with a Leica MZ8 stereomicroscope. Since the original description was very brief and used non-standard terminology, the male was re-described to allow comparison with the female character states and indicate variation. Body length and wing length ranges given are minimum and maximum values observed in the studied material. Body measurements were taken between the frons and the posterior end of tergite IV; wing measurements were taken between the tegula and the apex of the wing. Stacking pictures were made using the set-up as outlined in Brecko et al. (2014) and stacking was done with the Zerene Stacker software (https://zerenesystems.com/cms/home). Male genitalia were macerated for 24–48 hours in a 10% potassium hydroxide (KOH) solution at room temperature. Afterwards, genitalia were transferred to acetic acid for 24 hours, rinsed in absolute ethanol (EtOH) for a few hours and, thereafter, stored in glycerine. Digital images of genitalia were made with a Leica MZ16 microscope and mounted Leica DFC500 digital camera, using LEICA APPLICATION SUITE (LAS) automontage software v.3.8. Literature references are given for the original taxon description. For the type, text on identification and location labels is given *ad verbatim*. Text is indicated in quotation marks (“ ”) and each line on the label is separated by a double forward slash (//). Text not given on labels (i.e. collection depository) is given in square brackets ([]).

DNA barcoding

Procedures for DNA barcoding followed Jordaens et al. (2015). Briefly, genomic DNA was extracted from a single leg using the NucleoSpin Tissue Kit (Macherey-Nagel, Düren), following the manufacturer’s instructions. PCR reactions were undertaken in 25 µl reaction volumes, that contained 1.5 mM $MgCl_2$ in 1× PCR buffer (Invitrogen), 0.2 mM of each dNTP, 0.2 µM of each primer and 0.5 units of Taq polymerase (Invitrogen). The DNA barcode fragment of the mitochondrial cytochrome *c* oxidase

Table 1. Sequences from NCBI GenBank for *Meromacroides meromacriformis* (Bezzi, 1915) specimens from Togo and South Africa.

Species	Museum acronym	Voucher number	GenBank accession no.
Meromacroides meromacriformis	NMSA	NMSA-DIP-205959	MZ303633
Meromacroides meromacriformis	NMSA	NMSA-DIP 206122	MZ303634
Meromacroides meromacriformis	KMMA	RMCA-1088B03	MZ303635
Meromacroides meromacriformis	KMMA	RMCA-1088B04	MZ303636
Meromacroides meromacriformis	KMMA	RMCA-1224A02	MZ303637

subunit I (COI) gene was amplified using primer pair LCO1490 and HCO2198 (Folmer et al. 1994). The PCR profile was an initial denaturation step of 5 min at 95 °C, followed by 35 cycles of 45 s at 95 °C, 45 s at an annealing temperature of 45 °C and 1.5 min at 72 °C and ending with a final extension step of 5 min at 72 °C. PCR products were purified using the ExoSap protocol (Invitrogen), following the manufacturer's instructions. PCR-products were bidirectionally sequenced using the ABI PRISM BigDye Terminator v.3.1 Cycle Sequencing Kit and run on an ABI3130xl Genetic Analyzer. Sequences were assembled in SEQSCAPE v.2.5 (Life Technologies) and inconsistencies were checked by eye on the chromatogram. We obtained five DNA barcodes (three from Togo, two from South Africa) which were submitted to GenBank (Table 1). Uncorrected p-distances were calculated with MEGA v.7 (Kumar et al. 2016) to quantify intra-specific variation in the DNA-barcode region and to compare inter-specific p-distances to putative related genera in the Afrotropical Region.

Taxonomy and systematics

Meromacroides Curran, 1927

Meromacroides Curran, 1927 57: 69.

Type-species. *Eristalis meromacriformis* Bezzi, 1915 (by original designation).

Meromacroides meromacriformis (Bezzi, 1915)

Figs 1–14

Eristalis meromacriformis Bezzi (1915), Syrph. Eth. Reg.: 93.
Meromacroides meromacriformis (Bezzi) – Curran (1927), Bull. Am. Mus. Nat. Hist. 57: 69 – Smith and Vockeroth (1980), Cat. Dipt. Afrotrop. Reg.: 503 – Dirickx (1998), Cat. Syn. Géogr. Syr. Rég. Afrotrop.: 81 – Whittington (2003), Stud. dipterol. 10: 595.

Differential diagnosis. *Meromacroides meromacriformis* can be distinguished from any other hover fly species in the combination of the following characters: Postpronotum

Figures 1, 2. *Meromacroides meromacriformis* (Bezzi, 1915), habitus, lateral view **1** male specimen, South Africa (NMSA-DIP 206113) **2** female specimen, South Africa (NMSA-DIP 206122).

pilose; compound eye pilose; wing membrane microtrichose in apical 1⁄3; wing vein R_{4+5} strongly sinuate; wing cell r_1 closed and bulbous apically; thorax with triangular part of anepimeron and katepimeron weakly pubescent; metafemur greatly swollen.

Examined material. ***Holotype*:** Male from South Africa (NHMUK). South Africa. • 1 ♂; "Holo-//type". [printed, red border] "Eristalis//TYPE [printed]//meromacri//formis//Bezzi" [red border] "S. Africa//Plant//54. 83" "Eristalis//meromacriformis//n. sp.//type ♂" [all handwritten except as indicated]

While the holotype was described by Bezzi (1915) as "a single rather old and badly preserved specimen", it is still fully intact, albeit laden with dust and lint.

Other material. Benin. • 1 ♀; Pobè Forest; 6.963116, 2.674033; 10 Mar 2019; G. Goergen leg.; IITA. Democratic Republic Of The Congo. • 1 ♂; Mayumbe, Zobe; Jan 1916; R. Mayné leg.; KMMA [RMCA ENT000040207] • 1 ♀ ; Stanleyville [=Kisangani]; Mar 1914; Lang-Chapin leg.; KMMA [RMCA ENT000034070]. • 1 ♂; Stanleyville [=Kisangani]; Apr 1915; Lang-Chapin leg.; AMNH. Mozambique. • 1 ♂; Inhambane Province, Inhambane; Jan 1924; R.F. Lawrence leg.; [SAMDIP-A009617]. South Africa. • 1 ♂; KZN, Mtunzini, Raphia Palm Boardwalk; -28.95764, 31.76136; 7 Nov 2020; J. Midgley, T. Bellingan leg.; [NMSA-DIP 205959] • 1 ♂; KZN, Mtunzini, Raphia Palm Boardwalk; -28.95764, 31.76136; 4 Nov 2020; J. Midgley, T. Bellingan leg.; [NMSA-DIP 206113]. • 1 ♀ ; KZN, Mtunzini, Raphia Palm Boardwalk; -28.95764, 31.76136; 13 Nov 2020; J. Midgley, T. Bellingan leg.; [NMSA-DIP 206122]. Togo. • 1 ♂; Kloto Forest; Mar 2004; G. Goergen leg.; IITA [IITA DIP 00013902] • 1 ♂; Kloto Forest; Apr 2004; G. Goergen leg.; IITA [IITA DIP 00013903] • 1 ♀ ; Kloto Forest; Feb 2018; G. Goergen leg.; KMMA [RMCA_1088B03] • 1 ♂; Kloto Forest; Feb 2018; G. Goergen leg.; KMMA [RMCA_1088B04] • 1 ♀ ; Kloto Forest; Jan 2019; G. Goergen leg.; KMMA [RMCA_1224A02] • 3 ♂; Kloto Forest; Mar–Apr 2020; G. Goergen leg.; KMMA [RMCA ENT000033698 – 000033700] • 3 ♂; Kloto Forest; Mar–Apr 2020; G. Goergen leg.; IITA • 2 ♂; Kloto Forest; Mar 2021; G. Goergen leg.; IITA.

Male (Figs 1, 3, 5, 7–12). Body length: 11.6–14.3 mm. Wing length: 8.0–9.6 mm.

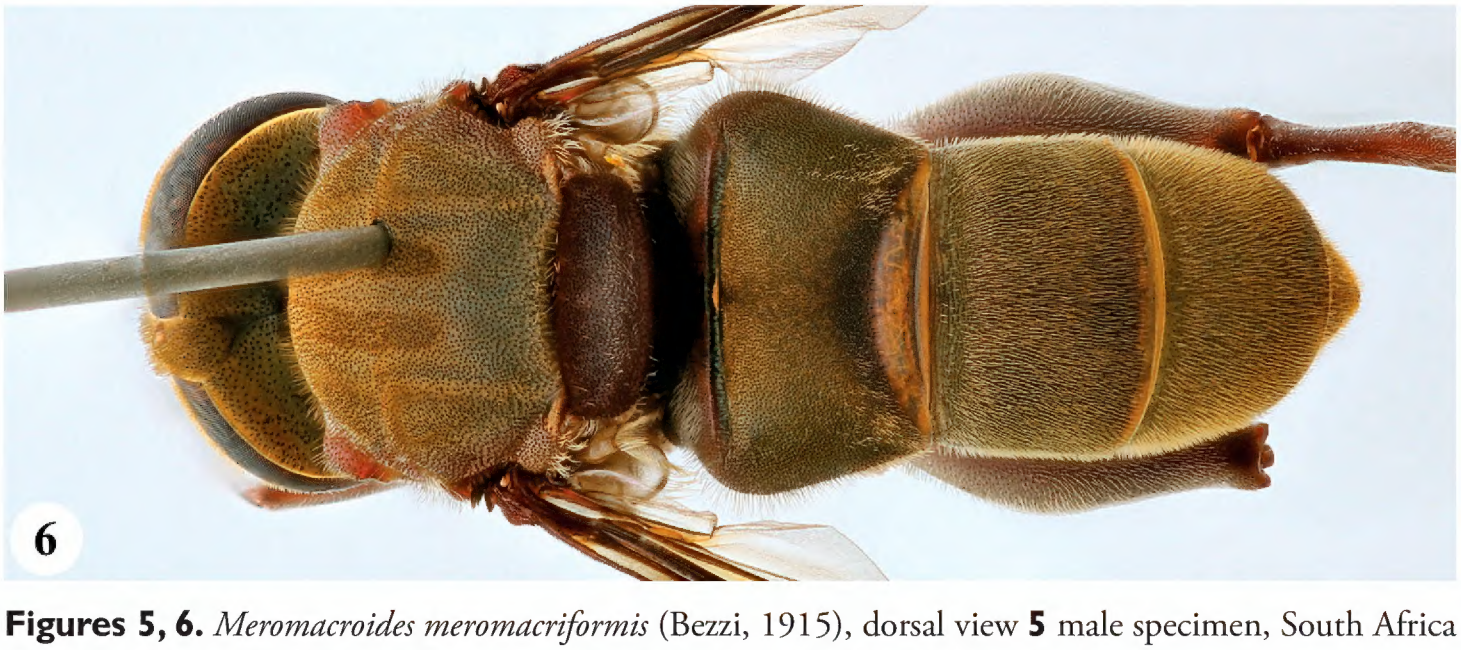
Head (Fig. 3). Eye yellow-white pilose, pile length four times the diameter of ommatidium in South African and West African specimens, three times in Central African specimens; ommatidia equal in diameter across the eye; dichoptic, but distance between eyes varying from the width of 1–3 ommatidia (Fig. 3). Frons brown; more densely yellow pollinose anterior to ocellar triangle, less densely yellow pollinose on ocellar triangle and vertex; long yellow pilose. Frontal triangle dark brown, but orange-brown at antennal tubercle; strongly yellow pollinose; long yellow-white pilose. Face orange-brown; subshining; weakly yellow pollinose, but bare on facial tubercle; with strong yellow pollinosity at eye margin; yellow-white pilose, but pilosity much longer on gena than on other parts; facial tubercle orange-brown; strongly pronounced and bare. Occiput dark brown, covered with dull yellow to grey pollinosity; with dispersed pale pile and a few shorter, stiff black spines near eye margin around the head. Antennal segments brown, postpedicel rounded; length to height approx. 1.2; white pollinose; arista orange-brown, bare.

Thorax (Figs 1, 5). Scutum sub-shining, reddish brown, dark brown to black, except postpronotum which is orange-brown; black punctuated; grey-white pollinose; with stronger pollinosity on anterior 1/5, along the transverse suture and at the poste-

Figures 3, 4. *Meromacroides meromacriformis* (Bezzi, 1915), frontal view **3** male specimen, South Africa (NMSA-DIP 206113) **4** female specimen, South Africa (NMSA-DIP 206122).

rior margin; pollinosity variable, appearing as two pollinose vittae fading at transverse suture in West African specimens, appearing as three darker pollinose vittae against a pale pollinose background in Central and South African specimens, with short yellow-white pile, at lateral margins somewhat longer. Scutellum dark brown, somewhat darker in anterior half; with even short black and yellow-white pile. Pleura ground colour red-brown to black-brown, except for anterior anepisternum where it is sometimes orange-brown; mostly even greyish pollinose, but anepisternum with reduced pollinosity anteriorly; covered with long pale pile on posterior anepisternum, katepisternum and anepimeron; very short white pubescence on other pleurites. Scutellum apical margin rounded, not marginated, 3× as wide as long; subscutellum bare.

Legs (Figs 1, 8). Proleg and mesoleg: Coxa orange-brown; white pollinose; with some long white pile anteroventrally. Trochanter orange-brown; white pollinose; with 7–8 short, light brown to black spines posteroventrally; with approx. 10 light brown to black spines on anterodistal end. Femur dark orange-brown; short white pilose; with very short black spines on dorso- and ventrodistal 2/3; with a patch of short black spines on anteroventral proximal end. Tibia dark brown to black; short white and black pilose. Tarsi dark brown to black dorsally, orange-brown ventrally; white pilose with some short, black spines on lateral sides. Metaleg: Coxa orange-brown; white pollinose; long white pilose anteroventrally. Trochanter orange-brown; white pollinose; with sparse yellow-white pile; with short, stiff black setulae ventrally. Femur strongly thickened, but markedly narrowed at distal end; at widest part as thick as approx. 1/4 of femur length; dark brown anteriorly, orange-brown posteriorly; short yellow-white pilose; with some very long white pile ventrally; with black setulae on ventrodistal 2/3 which are half the length of the sparse long white pile; with a patch of short black spines on anteroventral proximal end. Tibia slightly curved, but with a marked bend at proximal 1/8 dorsally; orange-brown but with a lighter ring in the middle; with a low carina on the entire anteroventral side; with a low carina from the distal end to the

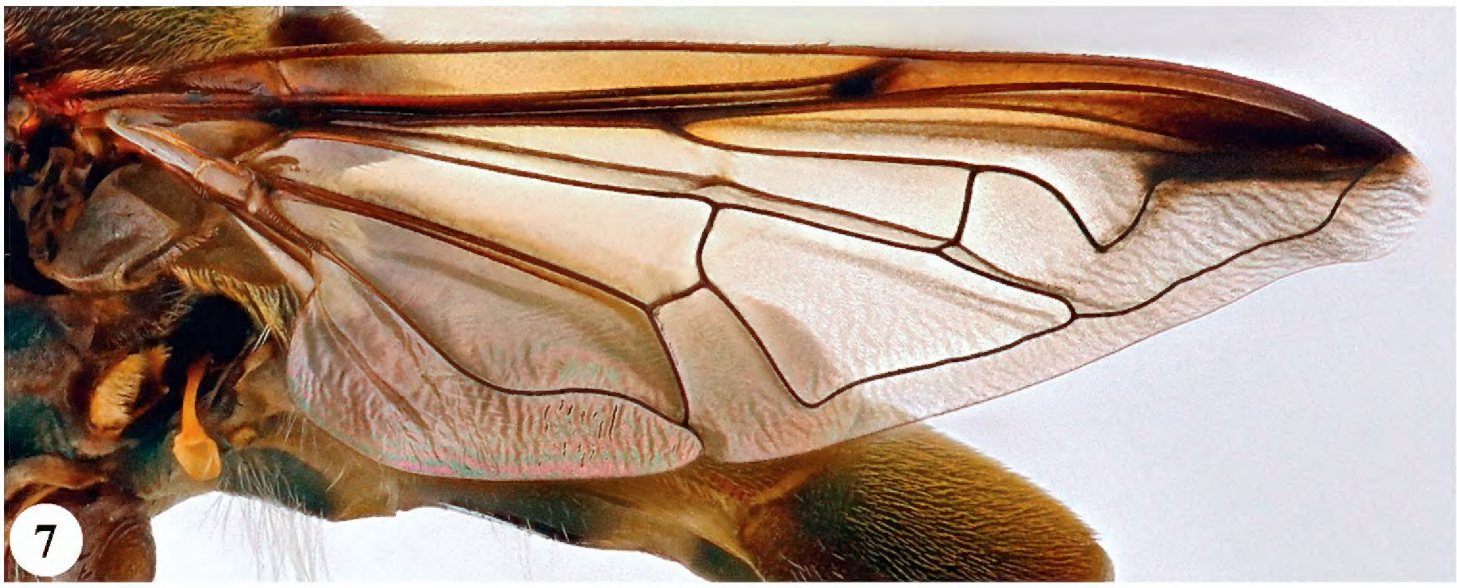


Figures 5, 6. *Meromacroides meromacriformis* (Bezzi, 1915), dorsal view **5** male specimen, South Africa (NMSA-DIP 206113) **6** female specimen, South Africa (NMSA-DIP 206122).

middle of the leg posteriorly; short yellow-white pilose; with some longer black hairs interspersed. Tarsi dark brown to black dorsally, orange-brown ventrally; white pilose with some black pile interspersed, especially ventrally.

Wing (Fig. 7). Entirely microtrichose; microtrichosity very dense on cells *sc*, r_1, r_{2+3} and the dorsal distal half of cell r_{4+5}. Cell r_1 closed, bulbous apically, petiolate; vein R_{4+5} sinuate, not appendiculate; vein *CuP* bent. Spurious vein running deep into cell r_{4+5}, approx. 2/3 of the way to vein M_1. Calypters dark grey to yellow; with fringe of white to yellowish white pile. Halteres white to pale brown; light orange-brown proximally.

Abdomen (Fig. 5): Narrow, conical; tergite II trapezoid; be:tergite III rectangular, 1.1 to 1.4× as long as wide; tergite IV rectangular, approx. 1.3× as long as wide. Subshining dark brown to black-brown on dorsal side, more orange-brown on lateral sides; tergites II–III with yellowish white to orange-brown posterior border; post-abdomen more orange-brown; with greyish to greyish-brown pollinosity, except for post-abdomen; with short dark pile, except on anterolateral corners of tergite V where it is longer and on tergite I and lateral sides where it is longer and white. Sternites orange-brown to dark brown, with short dispersed pale pile and longer dispersed pale pile medially. Dispersed pale pollinosity on sternites II–IV, sternite I bare.



Figures 7, 8. *Meromacroides meromacriformis* (Bezzi, 1915), wing and metaleg **7** left wing, male specimen, South Africa (NMSA-DIP 206113) **8** metaleg lateral view, male specimen, idem.

Genitalia (Figs 9–12). Cerci triangular, small; orange-brown; dorsally rounded in West African specimens (Fig. 12), but angular in South African specimens (Fig. 10); long yellow-white pilose. Epandrium large, elongated; broadly rounded at apex; dorsal and ventral margins straight and parallel in West African specimens (Fig. 11), rounded dorsally and not parallel in South African specimens (Fig. 9); ventrally expanded; with low ridge on inner side; with short, black spines on entire surface, but denser on inner low ridge; yellow-white pilose on dorsal half, black pilose on ventral half. Hypopygium small. Genitalia missing in Central African male specimen.

Female (Figs 2, 4, 6, 13, 14). Body length: 12.9–15.5 mm. Wing length: 9.0–9.9 mm.

As male, except for the following characters:

Head (Fig. 4). Eyes broadly dichoptic. Ocellar triangle and vertex lighter yellow pollinose; frontal triangle with pilosity and pollinosity as in male, but absent near antennal tubercle. Face very weakly yellow pollinose; occiput with stiff black spines laterally near eye margin, but absent dorsally.

Thorax (Figs 2, 6). Scutum with stronger pollinosity on anterior 3/5. Scutellum with pile longer and paler along the antero-lateral margins. Pleura whitish pollinose, but anepisternum bare anteriorly and with reduced pollinosity posteriorly, long pale pile longest in ventral region.

Figures 9–12. *Meromacroides meromacriformis* (Bezzi, 1915), male terminalia **9, 11** ventral view **10, 12** lateral view **9, 10** male terminalia from specimens from South Africa (NMSA-DIP 205959) **11, 12** male terminalia from specimens from Togo (RMCA-ENT000033698).

Legs (Fig. 2). Proleg and mesoleg: Coxa with pollinosity denser medially and anteriorly. Trochanter with 7–8 short, light brown spines posteroventrally. Femur orange-brown to dark brown; with short and medium length white pilosity, dorsal surface bare; with very short dark brown to black spines on dorso- and ventrodistal 2/3. Tibia dark brown fading to black towards distal end; with few stout black spines at posteroventral distal end. Metaleg: Trochanter with short, stiff, dark brown to black setulae ventrally. Femur with one row of pile along inner ventral surface of the femur and one row along outer ventral surface beginning at approx. the middle of the femur; with black setulae on ventrodistal 1/2–2/3 which are at least half the length of the sparse long white pile. Tibia orange-brown to dark brown becoming paler distally; short yellow-white to white pilose.

Abdomen (Fig. 6). Narrow, moderately conical; tergite II trapezoid, though not as markedly so as the male, comparatively slightly broader at distal end; tergite III rectangular, approx. 0.55× as long as wide; tergite IV rectangular, approx. 1.75× as wide as long. Tergite V triangular. Tergites II–III with light brown posterior border; postabdomen similar light brown; with greyish brown or greyish yellow pollinosity; with short pile that may be light or dark, except on anterolateral corners of tergite V where it is longer and on tergite I and lateral sides where it is longer and lighter in colour.

Geographic variation. Male and female specimens from Western, Central and Southern Africa differ in subtle characters (summarised in Table 2). In general ap-

Figures 13–15. A female *Meromacroides meromacriformis* (Bezzi, 1915) live pictures **13** female hovering above a rot-hole in the stem of a *Voacanga thouarsii* (Apocynaceae) tree at Mtunzini, KwaZulu-Natal (South Africa) **14** female alighted in a rot-hole, idem **15** relative size of the rot-hole illustrated with a 30 cm steel ruler, idem.

pearance, male specimens from Southern and Central Africa are larger than the West African specimens examined and more evenly and paler brown in ground colour. The contrast between light and dark parts of the body is less distinct than specimens from West Africa. The holotype does not differ from the recent Southern African specimens.

DNA barcodes. Table 1 contains GenBank accession numbers and institutional catalogue numbers for the five *M. meromacriformis* specimens barcoded. The mean p-distance in the DNA barcode region between specimens from Togo and from South Africa is 0.019 (or 1.9%).

Distribution. (Based on material examined, except as noted) Benin, Democratic Republic of the Congo (Curran 1927), Kenya (De Meyer et al. 1995), Mozambique, South Africa (also Bezzi 1915; Smith and Vockeroth 1980), Togo, Uganda (De Meyer et al. 1995; Smith and Vockeroth 1980).

Comments. The collector, RW Plant, moved to South Africa in 1850 and died on an expedition in 1858. During his time in South Africa, he lived in KwaZulu-Natal and there is no record of his travelling to other parts of South Africa. The only collecting trip he undertook that produced appreciable specimens was in 1858, to

Table 2. Geographic morphological variation observed from *Meromacroides meromacriformis* (Bezzi, 1915) specimens from West, Central and Southern Africa.

Region	West African specimens	Central African specimens	Southern African specimens
Character			
Head			
Eye pile length	Four times the diameter of an ommatidium	Three times the diameter of an ommatidium	Four times the diameter of an ommatidium
Thorax			
Scutum ground colour	Dark brown	Dark brown	Dark reddish-brown
Pleura ground colour	Black-brown	Dark brown	Dark reddish-brown
Scutum pollinosity	Two pale pollinose vittae	Two pale pollinose vittae	Two dark pollinose vittae
Legs			
Colour of spines on coxa and trochanter	Dark brownish – black	Light brown	Light brown
Wing			
Calypter colour	Dark grey	Brownish-grey	Brownish-grey
Calypter fringe colour	White	Yellowish-white	Yellowish-white
Haltere colour	White	Yellowish-brown	Yellowish-brown
Infuscation colour on wing margin	Light brown	Dark brown	Very dark brown
Abdomen			
Tergites II–III dorsal posterior border colour	Yellowish-white	Orange-brown	Orange-brown
Pollinosity colour and density	Greyish-white, sparser	Yellowish-white, denser	Yellowish-white, denser
Genitalia			
Cerci	Dorsally rounded	Genitalia missing	Dorsally angular
Epandrium	Dorsal and ventral margins straight and parallel	Genitalia missing	Dorsal margin rounded, not parallel with ventral margin

northern KwaZulu-Natal. The exact route of the expedition is unknown (McCracken 2011). Plant's diary was lodged at the Killie Campbell Library (Glen and Germishuizen 2010), but is now missing. The type data can be narrowed to the KwaZulu-Natal province between 1850 and 1858.

Biological observations. We observed two males and a female hovering inside a rot-hole in a single *Voacanga thouarsii* Roem. and Schult. (Apocynaceae) tree filled with termite frass (Termitidae: Termitinae: *Amitermes*?) and other biological material (Mtunzini, KwaZulu-Natal, South Africa) (Figs 13–15). The observations were made on three different days (4 Nov 2020; 7 Nov 2020; 13 Nov 2020) and no mating was observed. Only the female was observed alighting on the substrate (Fig. 14). The habitat is a modified Swamp Forest FOa2 (Mucina and Rutherford 2006) with an artificially high number of *Raphia australis* Oberm. & Strey. palms.

Discussion

Here, we have re-described the male and described the female of *Meromacroides meromacriformis*, an enigmatic monotypic hover fly genus of the Afrotropical Region. Our study is the first to provide high-resolution pictures of the general morphology (but see Ssymank et al. (in press) for a picture of the lateral view of a female and of a wing) and of the male genitalia and, thus, contributes to a better identification and knowledge

of the genus. For the first time, the description of the species includes the geographic variation in the species. We observed a p-distance of 1.9% between DNA barcodes from specimens from Togo and South Africa. While this is substantial, such variation is also observed in other Afrotropical Eristalinae (Jordaens et al., unpublished data). Moreover, Jordaens et al. (2015) showed that thresholds for the discrimination of intra- versus interspecific differentiation for Afrotropical hover flies may differ strongly amongst genera and that it is impossible to define a general distance threshold. Thus, is seems more appropriate to calculate optimal thresholds at the genus level to discriminate between intra- and interspecific variation in the DNA barcode region. We, therefore, consider the variation in morphology and DNA barcodes as insufficient to support the erection of formal taxonomic acts and consider all variations observed as intraspecific. In the Afrotropical Region, the nearest neighbours of *Meromacroides* are *Eristalis* (mean interspecific p-distance: 4–10%) and *Mallota* (mean interspecific p-distance: 7%) (Jordaens et al. unpublished data). We have provided a male specimen to a large-scale ongoing phylogenetic study of the subfamily Eristalinae of the World which will shed light on the genus' phylogenetic affinities (Moran et al., unpublished data).

The occurrence of the species in Benin and Togo (West Africa) indicates that the species is widespread over the Afrotropical Region and has been recorded from West (Benin, Togo), Central (Democratic Republic of the Congo), East (Kenya, Uganda) and Southern Africa (South Africa). While nothing is known on the ecology of the species or the larval stages, our observations provide potential insights. The observed behaviour suggests that rot-holes may be used as both mating and oviposition sites and, if this is true, then the species may be restricted to very old, mature forests where this specific habitat type may be more abundant. The upper layers of termite frass and rotting vegetable material were screened for eggs and larvae, but neither were found.

With a total of 27 specimens (18 males, eight females and one of unknown sex which is currently missing) known so far and the largest known series consisting of only four specimens, the species is very rare. The combination of limited habitat and low density drive this rarity, despite the wide geographic range within which the species is distributed. Rabinowitz (1981) highlighted this combination of rarity factors as showing increased risk to habitat destruction.

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